

## GALL MIDGES AS FOREST INSECTS.

---

By E. P. FELT, Albany, N.Y.

---

The minute gall midges or Itonididae have been practically ignored by the forester and, taken as a group, little is known of their economic importance under average woodland conditions. The larger, frequently abundant deformations produced by the gall-making wasps, Cynipidae, and the sawflies, Tenthredinidae, are relatively much better known, though it is probable that they are of less economic importance.

Numerous gall midges, referable to the Lestremiinae and Heteropezinae, live as larvae in decaying woody tissues and materially hasten the process of disintegration. Species of *Miastor* and *Oligarces* inhabit the inner bark of various trees in incipient stages of decay, while some species of *Monardia*, such as *M. lignivora* Felt have been reared from the fungous affected heart-wood of pine and undoubtedly hasten decay. Some Epidosariae inhabit dead, mostly dry, woody tissues.

All of the foregoing species are of less importance than the gall-making forms infesting living trees. The deformations of the latter may be conveniently classified according to the part affected.

Seed of fruit-inhabiting midges, such as *Dasyneura canadensis* Felt, may destroy a considerable proportion of seed in spruce cones. The same is true of *Oligotrophus betulae* Winn. and birch seed, while *Itonida catalpae* Comst. infests Catalpa pods and is a pest of some importance. Whitish, flower-shaped, fungoid galls, probably a bud and possibly a fruit deformation, are numerous in some parts of the South on Bald Cypress, *Taxodium distichum*, and are caused by *Itonida anthici* Felt. The extent to which fruit infestation may go in this group is shown by the rearing of seven species from the fruit of various wild cherries.

Bud galls are produced by many species and usually mean the death of the affected part, or at least a resultant deformation. The Catalpa midge, mentioned above, not only infests the seed pods but destroys the greenish tips and produces stunted, comparatively worthless trees. *Phytophaga ulmi* Beutm. and *Dasyneura ulmea* Felt infest lateral and terminal buds of elm sprouts and occur somewhat abundantly, though their injuries have not as yet been considered of much practical importance. The Box Elder in the West suffers from the attack of two gall midges, namely, *Cecidomyia negundinis* Gill., a bud-inhabiting

form, and *Contarinia negundifolia* Felt, a species which attacks the leaves while still within the bud. *Contarinia coloradensis* Felt infests and destroys the terminal buds of *Pinus scopulorum* in Colorado and occasionally appears to be somewhat abundant. Spruce buds are destroyed in Canada and probably in the Adirondacks by *Phytophaga tsugae* Felt and the terminal ones in part by *Rhabdophaga swaneii* n. sp.

RHABDOPHAGA SWANEII n. sp.

The midges described below were reared by Mr. J. M. Swaine, Ottawa, Canada, the latter part of May, 1914, from spruce bud galls. This species apparently confines its attack to the terminal bud. It is easily differentiated from other known species of *Rhabdophaga* by the characters given below.

Gall. The enlarged bud has a length of about 7 mm. and a diameter of 4 mm., the lateral scales being somewhat reflexed and the apical portion of the gall loose and open. It contains a central, oval cell about 1.5 mm. long.

Male.—Length 2.25 mm. Antennae probably nearly as long as the body, dark reddish brown, presumably with 14, and possibly with more, segments, the fifth with a stem about  $\frac{1}{2}$  the length of the basal enlargement, which latter has a length  $2\frac{1}{2}$  times its diameter. Palpi: first segment ovoid, the second  $\frac{1}{2}$  longer than the first, moderately stout, the third  $\frac{1}{2}$  longer than the second, more slender, the fourth  $\frac{1}{3}$  longer than the third, slender. Mesonotum shining dark brown, the submedian lines sparsely gray-haired. Scutellum, postscutellum and abdomen dark brown, the latter sparsely haired. Genitalia reddish brown. Halteres, coxae and femora basally reddish brown, the distal portion of femora, tibiae and tarsi mostly dark brown; claws moderately stout, curved, minutely unidentate, the pulvilli  $\frac{1}{2}$  longer than the claws. Genitalia: basal clasp segment moderately stout; terminal clasp segment rather short, swollen near the middle; dorsal plate deeply and triangularly emarginate, the lobes divergent, the outer margin tapering roundly to a narrowly rounded setose apex; ventral plate rather long, broad, deeply and roundly emarginate, the lobes short, stout, sparsely setose. Harpes broad, broadly rounded and thickly setose apically; style short, tapering, narrowly rounded distally.

Female.—Length 2.25 mm. Antennae probably extending to the second abdominal segment, sparsely haired, light brown. Mesonotum dull dark brown, the submedian lines sparsely fuscous haired. Scutellum dark brown, postscutellum a variable yellowish and dark brown. Abdomen dark brown, the margins and ovipositor reddish orange, the venter reddish brown. Halteres yellowish orange. Coxae yellowish brown; femora and

tibiae dark yellowish brown, the tarsi darker, almost black. Ovipositor moderately stout, as long as the body; terminal lobes broad, the length thrice the width and thickly setose. Other characters practically as in the male. Type Cecid a2520.

LEAF GALLS. The primary infestation, as we have shown elsewhere, frequently begins in the bud. Deformations belonging in this class are not very important, though *Thecodiplosis liriodendri* O. S. is responsible for serious disfiguration, and probably some weakening of tulip leaves, particularly in the latitude of North Carolina. The recently established box leaf miner, *Monarthropalpus buxi* Lab. of Europe, appears to be a serious pest of the highly prized ornamental Box. The young leaves of the Black Locust, *Robinia*, may be seriously deformed by the larvae of *Dasyneura pseudacaciae* Fitch, or the margins rolled by those of *Obolodiplosis robiniae* Hald. *Contarinia canadensis* Felt, the probable producer of the midrib gall on ash, is so abundant locally in the Hudson valley as to seriously affect the foliage of saplings. The extent to which leaf infestation may go is shown by the fact that some 22 species of gall midges are known to infest the leaves of hickory and about 20 those of oak. Most of these, as well as numerous other leaf-inhabiting forms, are of comparatively little importance.

STEM GALLS. Irregular, subcortical galls are produced in living tissues by species of *Rhabdophaga* and *Lasioptera*, the former being confined mostly to willow. The European *Rhabdophaga salicis* Schr. has become established in some localities where basket willows are grown and causes considerable loss by ruining the shoots for both basket work and the binding of bundles of nursery trees. Willow twigs are attacked by 21 American species of gall midges. *Lasioptera querciperda* Felt lives in the subcortical tissues of white oak twigs, producing gnarly areas and, presumably, defects in the wood. Several species of *Itonida*, *I. resinicola* O. S. and *I. resinicoloides* Wlms. attack the inner bark of young pines, and in some instances considerable pitch exudes and rather serious injury may result in the case of individual trees. *Itonida inopis* O. S. is a subcortical form, the larvae producing a swollen, gouty condition of the twigs and a marked lowering in the vigor of badly infested trees.

Root galls are known in only a very few cases, probably because of the difficulty of discovering them, and, so far as forest trees are concerned, none of importance have been recorded.

A general survey of the gall midges known to infest forest trees, shows that the hickories, the oaks and the willows, and to a less extent the poplars, all representing genera with a number

of closely allied species, are subject to attack by numerous gall midges, indicating an extremely close relation between the infested plant and the insect dependent thereupon. The bud-inhabiting gall midges are potentially the most destructive, and, owing to the known prolificacy of certain gall midges, it is to be expected that injuries by species referable to this group will become more, rather than less, apparent with the advance of time.

---

### EXCURSIONS.

---

The second excursion of the season was held on the afternoon of Saturday, May 9th, the locality visited being the north shore of the Ottawa River above the Chaudiere Falls. The rock formations were rich in fossils; the trees and general vegetation, at this season, were assuming their spring verdure, and the pools by the banks of the river contained a variety of forms of life. A large attendance of members was present and much interesting material was examined and collected. The President, Mr. Arthur Gibson, was in charge of the party. At the close of the outing addresses were delivered at the side of a grassy knoll close to the river, and the first leader called upon to speak was Mr. Halkett, of the zoological branch. Specimens of two kinds of small crustaceans—one an amphipod (*Gammarus*) and the other an isopod (*Asellus aquaticus*), as well as several kinds of fresh water pulmonate gastropod mollusks were passed around and points explained regarding their life-habits.

Miss Fyles spoke of the plants which had been observed or collected. Several specimens of *Geaster hygrometricus* were found. It was pointed out that the Geasters were distinguished from the puffballs by the outer coat, which breaks and spreads out in the form of a star, whence the name Earth-star. This odd and interesting fungus is very sensitive of moisture, spreading out its star-like coat in wet weather and folding in its points when the atmosphere is dry. Miss Fyles also gave an interesting account of the life-history of the Horse-tails (*Equisetum* spp.) and of many other plants which were handed to her to name.

A very interesting account of the herbs used by the Iroquois medicine men was given by Mr. Waugh, a leader of the archaeological branch, the substance of which he has since supplied in manuscript notes, which, given in his own words, are as follows:—

“A large number of animal and vegetable materials are used in the Iroquois medicines. Although many of the herbal or vegetable preparations are most effective from a therapeutic standpoint, a great deal of reliance is placed in sympathetic